

XI. *A Sketch of our present knowledge of the Neuropterous Fauna of Japan (excluding Odonata and Trichoptera).* By R. M'LACHLAN, F.L.S., &c.

[Read 7th June, 1875.]

As a continuation of the numerous memoirs on the Entomology of Japan that have appeared in our Transactions during the two preceding, and present, years, I offer a short sketch of our knowledge of a portion of the Neuropterous Fauna of the islands. The dragon-flies (*Odonata*) are omitted, because in them no materials have come before me; and I think that my friend Baron De Selys-Longchamps has the idea of publishing an account of those that are known to him at no distant date. The *Trichoptera* are not at present included, because, owing to pressure of other work, I have not been able to find time to make the drawings so indispensable when treating upon them; it must suffice to say here that the group is numerously represented in Japan, and contains many extraordinary forms. Limiting myself, therefore, to the *Pseudo-Neuroptera* (excluding *Odonata*) and *Planipennia*, I can enumerate only about 45 species, and of these some are not described for want of sufficient material.

It is to the collections made by Mr. H. Pryer, of Yokohama, and sent by him to his relative, Mr. Wormald, that I am indebted for an opportunity of studying the greater part of the insects here noticed. From Mr. George Lewis I have received several interesting species. In addition to these, some species exist in the collection of Baron De Selys-Longchamps (to whom I am indebted for duplicates), in that of the British Museum, and in my own. Lastly, and by no means of the least importance, Mr. Ritsema, of the Royal Museum of Natural History at Leyden, has entrusted to me a small collection, chiefly formed by Von Siebold the well-known traveller in Japan. Instigated by a knowledge of the exclusive privilege of trading with Japan so long possessed by Holland, it occurred to me to apply to Mr. Ritsema, and the result is that he forwarded to me several forms of the highest interest, and which have not been found by subsequent explorers.

The species known to occur in Japan may be referred to the following families:—

<i>Ephemeridæ</i> , 5 species.		<i>Mantispidæ</i> , 1 species.
<i>Perlidæ</i> 9 "		<i>Hemerobiidæ</i> 1 "
<i>Sialidæ</i> 3 "		<i>Osmylidæ</i> 4 "
<i>Raphidiidæ</i> 1 "		<i>Chrysopidæ</i> 4 "
<i>Myrmeleonidæ</i> 5 "		<i>Panorpidæ</i> 10 "
<i>Ascalaphidæ</i> 2 "		

With these limited materials it would be unsafe to generalize upon any faunistic peculiarities presented by them. One of the most interesting facts is the occurrence of an endemic species of the restricted genus *Ascalaphus*, a genus that has its head-quarters on the northern shores of the Mediterranean, although one species is known to occur in Mongolia and Eastern Siberia. The most striking feature is the number of interesting *Panorpidæ*, including forms that have rendered necessary the construction of two new genera; and large as the number already is, it may be considered practically certain that it only represents a tithe of the species that exist.

EPHEMERIDÆ.

EPHEMERA, Linné (restricted).

E. orientalis, sp. nov.

Pale greyish-yellow, a long black streak on each side of the mesonotum. Abdomen above narrowly-blackish at the sutures; the first three or four segments and the two apical ones without longitudinal lines; the intermediate with five black longitudinal lines, whereof one is straight and central, with two on each side slightly curved; tails yellowish, the basal portion unannulated, afterwards with narrow-blackish sutural annulations; appendages rather short; the two apical joints short; penis divided to its base, the two lobes dilated at the apex and there approximate; the underside of the abdomen with only two lines (one on each side, and those straight) on the intermediate segments. Legs pale yellow, the anterior tibiæ and tarsi fuscous; the tarsi transversely corrugated. Anterior wings vitreous, with a yellowish tinge; neuration blackish, costal veinlets incrassate and deep black; the nodal veinlets strongly margined with blackish, and there are one or two other blackish points; posterior wings immaculate, but with a rather broad pale-greyish border. (♂ imago.)

Expanse 32 mm.

In the Leyden Museum; captured by Von Siebold.

By the nature of the markings of the abdomen, this bears some slight resemblance to the European *E. lineata*, Eaton; the individual is in indifferent condition.

E. japonica, sp. nov.

Very pale yellow, a black line on each side of the pronotum; the abdominal segments above, before the apex, with a very oblique narrow black line on each side, thus: \ /, beneath with similar lines; on the segments immediately before the penultimate there is also frequently a short, black, central line; tails brownish, the sutures black, and the base dark fuscous, almost blackish; appendages of the ♂ pale yellowish-white; the second joint very long and slender, and strongly curved outwards; the two terminal joints (3rd and 4th) very short; the 3rd fuscous, the basal joint very short; penis notched at the apex, the two points turned inward. Legs very pale yellow; in the anterior pair the tips of the femora, and the whole of the tibiæ and tarsi, fuscous. Wings very pale greenish-yellow, with blackish veins; in the ♀ there is a small nodal point, and another discal (still more minute), fuscous; in the ♂ the anal portion of the anterior wings has a narrow greyish border, and there is a broader border to the posterior wings in both sexes.

The sub-imago only differs in that the colour of the body is duller and the wings slightly less transparent.

Expanse ♂ 26 mm., ♀ 32 mm.

Yokohama (*Pryer*).

A delicate insect, with very evanescent appearance.

Both these Japanese species are distinct from the Chinese *E. serica*, Eaton, which should perhaps be placed between them; it differs in markings, and also especially in the long and slender apical joints of the appendages in the ♂.

LEPTOPHLEBIA, Westwood.

L. elongatula, sp. nov.

(♀ imago.) Dark liver-colour. Legs pale yellowish; anterior pair almost wholly fuscous, the femora paler; posterior tarsi 4-jointed. Tails blackish-fuscous. Anterior wings elongate, narrow, vitreous, with the costal margin narrowly brownish-yellow; neuration fuscous, yellowish at the base, and the subcosta and radius yellowish in their

basal half; inner marginal area almost without transverse nervules; costal area at the apex with two rows of large irregular cellules. Posterior wings nearly orbicular; costal margin strongly arcuate and without any projection.

(♀ subimago.) Head and thorax dull greyish-fuscous; abdomen blackish-fuscous, darker at the sutures. Legs dull pale-yellowish. Tails black. Wings smoky-grey, with black veins; the anterior pair with the costal margin broadly ferruginous.

Expanse 27 mm. Length of anterior wing 14 mm., of posterior $3\frac{3}{4}$ mm.

Yokohama (*Pryer*).

In the absence of the ♂ the most striking character of this species is the broad ferruginous costal margin of the anterior wings of the sub-imago.

DIPTEROMIMUS, gen. nov.

♂. Eyes very large, but probably simple. Abdomen long and slender; last ventral segment completely separated laterally from the dorsal, forming a sub-quadrate plate bearing the forceps, which are four-jointed; penis long and slender; two tails. Anterior legs very slender. Anterior wings long and very narrow, especially at the base; transverse veinlets numerous and disposed over all the wing; no rudimentary marginal veinlets. Posterior wings very minute, narrow, the costal margin simple.

Although the insect upon which this genus is founded is old and much mutilated, it differs so much from all described genera that I have not hesitated to form a new one for it. It bears a striking resemblance to a small *Tipula*, and should probably be placed near *Siphylurus* and *Hexagenia*.

D. tipuliformis, sp. nov.

♂ imago. Fuscous, with a testaceous tinge above, pale yellow beneath; head black between the ocelli; hinder lobes of meso- and meta-nota yellow. Legs (all but the anterior mutilated) testaceous. Wings vitreous, with brown veins. Tails blackish? (only basal joints present). Last dorsal segment of abdomen rounded on its margin; the ventral segment supporting the forceps very large, broadly and triangularly excised in front; basal joint of forceps very short, 2nd long and curved; 3rd and 4th very short, the 4th somewhat shorter than the 3rd; penis long and slender, curved upward, furcate at the apex.

Length of body (without the tails) 11 mm.; expanse of wings 23 mm.; length of anterior wing $10\frac{1}{4}$ mm., breadth 3 mm.; length of posterior wing about $2\frac{1}{4}$ mm.

One ♂ in the Leyden Museum; collected by Von Siebold.

CLÖEON, Leach.

C. dipterum, L.

Two ♀ imagos from Yokohama (*Pryer*). Not differing from European examples.

PERLIDÆ.

PERLA, Geoffroy.

P. tibialis, Pict.

P. tibialis, Pict., Perlides, 217, pl. 18, figs. 6, 7.

This species may be briefly described as having a black head and thorax, bright yellow abdomen, yellow wings, and black legs with yellow tibiae. Specimens in De Selys' collection and my own agree perfectly with Pictet's description, and with the dimension for the length of body, but only expand to 35 instead of 45 mm., and all are females.

Perla tinctipennis, sp. nov.

Head black in the middle, yellow anteriorly and posteriorly. Pronotum slightly narrower than the head (with the eyes), broader than long, slightly broader anteriorly; the sides straight, with sharp angles, blackish-fuscous with a narrow median impressed yellowish line, the disk coarsely rugose; meso-notum blackish, with yellow spots; abdomen dull ochreous (the whole under surface of the body pale ochreous); tails yellow; egg-valve very narrow, with a triangular excision in the middle; legs yellow, the tibiae and apex of femora blackish-fuscous; wings long, pale olivaceous or yellowish, with the costal margin more strongly coloured; neuration yellow, the transverse nodal nervure somewhat fuscous and clouded (♀).

Length of body (without the tails) 21 mm.; expanse 70 mm. One of the largest known species, with somewhat the colours of *P. tibialis*.

Yokohama (*Pryer*). One ♀ in Wormald's collection.

Perla limbata, Pict.

P. limbata, Pict., Perlides, 219, pl. 9, figs. 1 to 5.

I have three examples from Kobé (*Lewis*) agreeing in the main with Pictet's description and figure. The egg-valve of the ♀ is very broad, rounded anteriorly, and extending beyond the margin of the penultimate segment.

Perla niponensis, sp. nov.

Head broadly shining black on the disk, pale yellow on the margins; *only two ocelli*, placed very far behind, with a flat-topped tubercle on each side; antennæ fuscous, the second joint pale yellow. Pronotum much broader than long, the sides nearly straight, anterior angles sharp, the posterior rounded; median raised lines very distinct, and the disk rugose and tuberculate; it is narrowly margined with black, and with a broad central blackish band, leaving the sides greenish-yellow; meso- and meta-nota almost entirely fuscous. Abdomen dull ochreous above, the whole underside of the body pale greenish-yellow; tails yellow; egg-valve very large, triangularly produced anteriorly, but obtuse at the apex, not extending to the margin of the penultimate segment. Legs greenish-yellow; femora and tibiæ externally, and the tarsi wholly, fuscous. Wings uniformly smoky, excepting the costal margin, which is conspicuously pale greenish-yellow; neuration (excepting the costa and sub-costa) blackish-fuscous: the discoidal cell of the posterior wings is shorter and more triangular than is usual.

Length of body (without the tails) 12 mm.; expanse 38 mm.

Two females from Yokohama (*Pryer*) in Wormald's collection.

Perla lugubris, sp. nov.

Head and thorax wholly dull black above and beneath; ocelli reddish; eyes brown; an oblique flat elongate tubercle on each side of the disk; antennæ brownish in the basal half, afterwards black. Pronotum slightly broader than long, the sides straight; disk coarsely rugose. Abdomen grey, with a yellowish tinge, the tails concolorous. Wings uniformly smoky, with strong black neuration; the area between the sub-costa and radius in the anterior pair dark fuscous; this pair very elongate and narrow, and

the apical portion of the posterior pair is also narrowed. Legs uniformly blackish-fuscous.

Length of body (without the tails) 19 mm.; expanse 56 mm.

One ♂ from Kobé (*Lewis*) in my collection.

I have a ♀ (from Kobé) that may belong here, but it is scarcely probable; it has the same forms and colours for the head, thorax and legs; the abdomen is castaneous, blackish in the basal portion above; the egg-valve very small, consisting of only a narrow truncated production of the median portion of the margin of the segment; the wings are browner, with the costal margin distinctly pale, and the apical portion of the posterior wings broader.

I have yet three other species of *Perla* (each possessing only two ocelli) from Japan, but think it prudent not to describe them until more materials are before me. Neither of them will accord with the description of the following, which remains unknown to me.

P. geniculata, Pict.

P. geniculata, Pict., Perlides, 232, pl. 21, figs. 1, 2.

Communicated to Pictet, by De Haan, as coming from Japan.

SIALIDÆ.

NEUROMUS, Rambur.

N. grandis, Thunberg.

Hemerobius grandis, Thbg., Nov. Ins. Sp., pt. 1, 28, fig. 44.

In De Selys' collection and my own.

Since the publication of my paper on the species of *Chauliodes* and allies, in the "Annals and Magazine of Natural History" (July 1869), I have received a ♂ of the true Japanese *N. grandis*, and am now not sure that the Chinese *Hermes costalis* and *H. anticus* of Walker are specifically the same, although these two are identical. Putting on one side certain colour differences, the anal parts have a different appearance. In the ♂ of *N. grandis* the superior appendages are excised at the apex, and produced into a spine at the inner angle; in *costalis* (of which *anticus* is the ♀) they appear to be shorter and obtuse; in the Himalayan *N. infectus*, M'Lach., they are extremely long, and narrowly lanceolate.

CHAULIODES, Latreille.

C. japonicus, M'Lach.

C. japonicus, M'Lach., Journ. Linn. Soc., Zool. ix, 232.

Yokohama (*Pryer*), in Wormald's collection; also in my own and in that of De Selys, from uncertain localities.

The individual taken by Mr. Pryer is rather larger than those previously seen by me (expanse 105 mm.); I have not yet seen the ♂, but the ♀ has the antennæ (mutilated in other examples) obtusely serrate within up to the apex, each joint being triangularly dilated internally.

SIALIS, Latreille.

S. —, sp. nov.?

Kobé (*Lewis*); Yokohama (*Pryer*); also in De Selys' collection.

Without seeing examples of the ♂ in better condition (or in alcohol) I cannot venture to say whether this be, or be not, distinct from the Siberian *S. sibirica*, M'Lach. The species of *Sialis* can only be satisfactorily determined from an examination of the anal parts of the ♂.

RAPHIDIIDÆ.

INOCELLIA, Schneider.

I. crassicornis, Schummel.

One pair (♂ ♀) from Yokohama (*Pryer*), in Wormald's collection.

I have compared these with others from Europe and Eastern Siberia without discovering any difference that appear to be specific; but it is desirable that more be examined, and, if possible, individuals in alcohol.

MYRMELEONIDÆ.

ACANTHACLISIS, Rambur.

A. japonica (Hagen), sp. nov.

Greyish-fuscous, clothed with whitish-grey pilosity. Antennæ fuscous, with narrow testaceous annulations. Face, and two basal joints of antennæ beneath, yellow. Pronotum varied with yellow, the anterior margin forming two rounded lobes, the disk deeply bi-impressed trans-

versely, rather narrower in front than behind. Breast and legs with dense hoary pilosity; femora reddish, becoming piceous at the tips; tibiæ yellow, the anterior and intermediate annulated with black; spurs geniculate, but not strongly so. Wings semi-vitreous, with slight fuscous clouds; neuration yellow, strongly streaked and spotted with black; pterostigma opaque, greyish-yellow, marked with fuscous internally: in the anterior wings the costal area is occupied by two regular rows of pentagonal cellules, whereof those of the upper row are slightly smaller than the lower, the first seven or eight basal cellules simple. The abdomen of the ♂ terminated by a pair of short, broadly oval, blackish appendages, densely clothed with long black spiniform hairs turned inwards (♂).

Length of body 45 mm.; expanse 110 mm.

I have a ♂ without any indication of special locality. No doubt it is the same as the species recorded (but not described) by Hagen under the above name. He queries it as perhaps identical with the Spanish *A. bætica*, Rbr., a species practically unknown to me, but I doubt not that, although allied, the two are distinct.

GLENURUS, Hagen.

G. japonicus, M'Lach.

G. (?) japonicus, M'Lach., Journ. Linn. Soc., Zool. ix, 248.

This pretty species—readily distinguishable by the oblique, semi-lunate, dark mark on the middle of the inner margin of the anterior wings, and the short, broad, dark streak near the apex of the posterior—appears to be common, and comes in all collections from Japan.

FORMICALEO, Brauer.

Formicaleo contubernalis, sp. nov.

Body black. Antennæ (mutilated), with the two basal joints yellow. Face and palpi wholly pale yellow; vertex swollen, with numerous small orange-yellow spots. Pronotum longer than broad, scarcely narrower in front, with a deeply impressed transverse line anteriorly, and a broad, concave space posteriorly; marked with orange-yellow spots irregularly arranged in three distant longitudinal rows; an indication of the two lateral rows is to be seen

on the meso-notum, and there is a short line on the scutellum of this segment; the meta-notum has a semicircular orange-yellow marking, and a median line on its scutellum (or hinder lobe). Abdomen black, the posterior margin of most of the segments narrowly yellow; this colour broadest on the terminal segments, upon which it is continued all round the margin, and, in addition, there is also on those segments a ventrally lateral yellow longitudinal line; the 2nd and 3rd segments have a narrow, interrupted, dorsal orange-yellow line, and the sides of the 3rd have like-coloured spots. Legs yellowish, with numerous small black spots, the anterior and intermediate tibiae with two black semi-annulations externally; tarsal joints blackish at the apex; hairs long and whitish; spurs testaceous, slightly exceeding the four basal joints of the tarsi; claws testaceous, strongly curved downward. Wings elongate, the posterior narrower and more acute; vitreous with a small blackish point near the termination of the cubiti on the anterior pair; pterostigma whitish, indistinct; venuration mostly black, interrupted with whitish, the sub-costa and radius with strongly marked black and yellowish alternate spaces; gradate veinlets wholly black, costal veins wholly pale.

Length of body 34 mm.; expanse 80 mm. Greatest breadth of anterior wing 9 mm., of posterior $7\frac{1}{2}$ mm.

In De Selys' collection and in my own.

An inconspicuous species.

MYRMELEON, Linné (restricted).

M. formicarius, L. (= *formicalynx*, Burm. et auct.)

One example from Yokohama (*Pryer*), in Wormald's collection. It is of large size (expanse 80 mm.), but differs in no way from European examples. The species is spread over the whole of Europe, and through Central and Northern Asia to Japan. I have it from East Siberia and North China.

M. micans, sp. nov.

Head and thorax blackish above, vertex with an impressed yellowish median longitudinal line, continued as a yellowish line on the pronotum; the latter short, also yellowish on the anterior angles and slightly on the lateral edges; antennæ rather long, deep black; clypeus and labrum

pale yellow, as is also the whole of the breast, the dark dorsal and pale pectoral colours of the thoracic segments very sharply defined when the insect is viewed laterally. Legs concolorous with the breast, with black spines; all the tarsi dark brown or blackish, and there is sometimes a fuscous line on the posterior tibiæ internally: spurs rather longer than the first tarsal joint. Abdomen greyish-brown, paler beneath, clothed with pale-brownish or yellowish hairs. Wings vitreous, nearly colourless, but very highly iridescent; pterostigma whitish; neuration fine, pale, with short blackish ciliations: anterior pair rather broad, considerably dilated beyond the middle, but in a gradual manner, the extreme apex sub-acute; posterior pair narrower, scarcely shorter, the apex much more slender and acute.

Length of body 32—35 mm.; expanse 81—90 mm. Greatest breadth of anterior wing 12—13 mm., of posterior wing 10—11 mm.

In De Selys' collection and my own; also in Wormald's (Yokohama, *Pryer*), and in the Leyden Museum (*Von Siebold*).

ASCALAPHIDÆ.

ASCALAPHUS, Fab. (restricted).

A. Ramburi, sp. nov.

Black; front clothed with greyish hairs, as are also the sides of the abdomen, otherwise the clothing is blackish; a yellow crescentiform mark below the basal joint of each antenna frontally, and the facial eye-margins broadly yellow. Prothorax with a raised yellow spot on each side. Meso-thorax with ten yellow spots above, and a divided one on each side below the wings. Legs orange-yellow; the basal half of the femora, the tibiæ at their tips, and all the tarsi, deep black. Anterior wings vitreous, with black neuration, and a small brown pterostigma; at the extreme base the costal and inner margins are pale sulphur-yellow, the intermediate portion of the base fuscous. Posterior wings not much dilated on the lower margin; smoky brown, with pale centres to many of the cellules, the basal portion shining blackish to the anal angle; costal area towards the base pale yellow, with a brown pupil in each of the cellules, the sector and its

branches, and many of the nervules starting from it, margined with pale yellow; the region of the cubiti is occupied by a rich yellow streak, deeply furcate from the point where the lower cubitus divides, many of the nervules between the branches of the fork being margined with the same colour: pterostigma darker brown (♀).

Length of body 23 mm.; expanse 59 mm. Greatest breadth of posterior wing 9 mm.

One ♀ in the Leyden Museum; collected by Von Siebold, forwarded to me with the name (in MS.) here retained.

A true *Ascalophus*, in form resembling *A. sibiricus*, Ev., but differing greatly in coloration. The individual before me appears to be highly mature, so that, in all probability, the posterior wings in less adult examples will be found to be less darkly coloured.

HYBRIS, Lefebvre.

H. subjacens, Walker.

Ascal. subjacens, Walk., Cat. Brit. Mus., Neurop. 431;

H. subjacens, M'Lach., Journ. Linn. Soc., Zool. xi. 267; *A. remotus*, Walk., l. c. 447.

In all collections received from Japan, and apparently common. Occurs also in North China and the Island of Formosa.

The amount of tinting of the wings varies considerably, probably according to degrees of maturity. Sometimes the wings are wholly vitreous (always excepting the large black pterostigma), or they may be vitreous with the post-stigmatal area smoky, or wholly pale smoky-brown.

The type of *A. remotus*, Walker, placed by him in the division of *Ascalaphidæ* in which the eyes are entire, is only an example of this species with one division of the eyes removed.

MANTISPIDÆ.

MANTISPA, Illiger.

M. japonica, sp. nov.

Head yellow, with a black line down the face; antennæ fuscous, the basal joints fuscous; sub-moniliform, with about 30 joints; palpi reddish, the terminal joint piceous at the apex. Prothorax long, dark brown, the dilated anterior portion black, with two yellow spots, forming a

nearly continuous transverse band; a little behind the anterior portion are two yellow tubercles, the remaining portion finely corrugate. Meso- and meta-thorax varied with yellow, black, and brown. Abdomen much thickened at the apex, yellow above, with an irregular central brown band; beneath blackish, varied with yellow; in the ♂ there are two short, stout, and obtuse lateral appendages, and a large boat-shaped lobe from the middle of the last ventral segment, from within which proceeds the spiniform penis, which is strongly curved, and annulated with black and testaceous. Legs yellowish; posterior tibiæ marked with brownish externally, and the tarsi are brownish; anterior raptorial femora deep black internally, strongly toothed, the basal spine very long. Wings vitreous; neuration black; costa and radius pale; pterostigma very long and narrow, blood red; 7—8 costal nervules in the anterior wings, and about 12 discal cellules, the greater part of which are narrowed in the middle through the bending of the nervules.

Expanse 29 mm.

One ♂ from Yokohama (*Pryer*), in Wormald's collection.

HEMEROBIIDÆ.

HEMEROBIUS, Linné.

H. —, sp. ?

One male from Kobé (*Lewis*), much resembling *H. humuli*, but larger; the anal appendages deeply furcate.

OSMYLIDÆ.

OSMYLUS, Latreille.

† *O. flavicornis*, sp. nov.

Antennæ yellow, with rather long concolorous hairs, the extreme apex blackish. Head black; the ocelli yellow, and surrounded by the same colour. Pronotum yellow, with three black spots placed in a triangle, the sides with blackish hairs. Meso- and meta-nota yellow, spotted with black. Abdomen blackish, spotted with yellow. Legs yellow; claws simple, very strongly curved. Anterior wings not very broad, sub-acute at the apex, vitreous with black veins; pterostigma with thickened dark-brown

veinlets on each side; one or two minute basal spots, one or two in the middle, and a large one beyond the middle (formed of two or three smaller spots), all dark brown or fuscous; the inner margin clouded with greyish-testaceous, and many of the discal veinlets margined with the same colour; all the costal veinlets simple; the sector with about 13 branches; the two series of gradate veinlets rather irregular and scarcely parallel; in the posterior wings the dark spots are absent, excepting that at the pterostigma.

Expanse 34 mm.

One example from Yokohama (*Pryer*), in Wormald's collection.

O. tessellatus, sp. nov.

Black, with grey pubescence. Head much swollen above; the ocelli minute, yellow, and there is a yellow ring at the base of the antennæ; face yellow, with a furcate black mark between the antennæ; a small yellow spot in the middle of the pronotum anteriorly. Legs pale yellow, with concolorous hairs; terminal tarsal joint blackish; claws strongly serrate internally. Anterior wings elongate and broad, vitreous; most of the neuration is black, but partly whitish, the sub-costa and radius yellowish, with black lines; many of the transverse veinlets are broadly margined with dark grey, giving the wings a chequered appearance; the inner marginal and apical area clouded with grey in an irregular manner, causing pale and dark spaces; some darker (almost blackish) spots at the pterostigma and on the disk; costal veinlets mostly simple; sector with 15—16 branches; the series of gradate veinlets very irregular, many of those in the outer series absent. Posterior wings with dark marks at the pterostigma, the inner marginal area clouded with pale grey.

Expanse 52 mm.

One example from Yokohama (*Pryer*), in Wormald's collection.

O. Pryeri, sp. nov.

Head and thorax yellowish-grey; clypeus and labrum yellowish; upper part of face and front of vertex shining black, and the margin of the vertex and of the pronotum is black; the pronotum with long black hairs at the

sides; lobes of the meso-notum much swollen, and deep black; meta-notum almost wholly black. Abdomen black, with pale hairs. Legs yellow, with pale hairs; terminal joint of the tarsi black; claws serrate internally. Anterior wings acute at the apex, pale greyish-fuscous; neuration blackish, excepting the sub-costa and radius, which are yellowish; the cubital discal region and pterostigma with darker fuscous spots, those in the former position forming an ill-defined irregular line running into the apex, and bordering the inner marginal area, which is almost uniformly greyish-fuscous, with a series of whitish spots on the margin; costal veinlets mostly simple; sector with about thirteen branches; the two series of gradate veinlets complete and nearly parallel. Posterior wings paler, subhyaline, without markings, except the brown pterostigma.

Expanse 52 mm.

One example from Yokohama (*Pryer*), in Wormald's collection.

O. hyalinatus, sp. nov.

Head yellow; colours changed in dry individuals (but bright yellow in one that had been in alcohol); antennæ black. Pronotum black, varied with yellow. Abdomen brown, with pale hairs, yellowish at the apex. Legs pale yellow, with concolorous hairs; claws simple. Anterior wings broad, subacute at the apex, subhyaline, with a greyish tinge, highly iridescent; neuration black, but the subcosta and radius yellowish; as a rule without spots, but occasionally there is a small dark discal point, and another on the outer series of gradate veinlets; inner marginal area sometimes slightly clouded; pterostigma brownish; all the costal veinlets (excepting those at the base) are furcate, and almost invariably several of them towards the base are united by a little cross veinlet, forming, in these cases, double cellules; sector with 11—13 branches; the two series of gradate veinlets complete and nearly parallel. Posterior wings without markings, excepting the brown pterostigma.

Expanse 45—50 mm.

Yokohama (*Pryer*); Kobé (*Lewis*). Several examples. In form this more resembles the European *O. chrysops* than do the other species.

CHRYSOPIDÆ.

CHRYSOPA, Leach.

C. bipunctata, Burm.

C. bipunctata, Burm., Handb. 982; Schneider, Mon. Chrysop. 103, tab. 31.

I have seen nothing from Japan with which Schneider's words, "*stria arcuata ante antennas*," will agree; but see remarks on next species.

C. cognata, M'Lach.

C. cognata, M'Lach., Journ. Linn. Soc., Zool. ix., 249.

Probably common; found also in China and Cambodia. In one example from Japan there is a spot between the antennæ (absent in all the others), and it thus shows an approach to *C. bipunctata*; but in no individual is there any trace of black spots or streaks *before* the antennæ. The species is closely allied to the European *C. 7-punctata*, and (with *bipunctata*) may be only a local condition thereof.

C. microcephala, Brauer (?).

One individual from Yokohama (*Pryer*), in Wormald's collection, may possibly be this species, which is very near the abundant and widely-spread *C. vulgaris*, if indeed it be not a condition of that insect.

NOTHOCHRYSA, M'Lach.

N. japonica, sp. nov.

Head and two basal joints of antennæ yellow, the rest of the antennæ deep black. Pronotum broader than long, with a deep, impressed, longitudinal line in the middle; yellow, tinged with reddish. Meso- and meta-nota yellow, with large black spots at the sides; the sides of the thorax, below the wings, varied with black and yellow in a maculose manner. Abdomen yellow above, with a broad black dorsal line; beneath black, with narrow yellow margins to the segments, and the apex yellow. Wings narrow and elongate, subacute, nearly colourless (probably greenish-yellow in life); neuration mostly yellowish (green?); the lower half of the apical veinlets towards the base in the anterior wings, and the apical half of the sector in both

pairs of wings, dusky; pterostigma long and narrow, brownish; in the anterior wings the upper half of the 3rd cubital cellule is narrower, the dividing veinlet somewhat oblique; 15—16 nervules between the radius and the sector; the two series of gradate veinlets nearly parallel.

One example in the Leyden Museum; captured by Von Siebold. A pretty and strikingly-marked species.

Expanse 37 mm.

PANORPIDÆ.

PANORPA, Linn.

Notwithstanding that the species of this genus already known from Japan are both numerous and handsome, we are (as I have stated in the introductory remarks) probably only acquainted with a small proportion of those that exist. In 1867, in the *Journal of the Linnean Society, Zoology*, vol. ix. pp. 256—258, I enumerated five species; since then others have been discovered. They appear to constitute a group (extending into North China and Amur Land), one of the peculiarities of which consists in the fact that the sub-costa in all the wings scarcely extends beyond the middle of the costal margin, a peculiarity only to be found in one true European species (*P. alpina*), which otherwise has no intimate connection with the Japanese group. I propose to describe all the species, as an incentive to resident entomologists in Japan to extend our knowledge of the genus.

P. japonica, Thunberg.

P. japonica, Thbg., *Nov. Ins. Sp. Dissert.*, iii. 67, fig. 9; *Dissert. Acad. Upsal.*, iii. 187, tab. ix. figs. 15, 16; Klug (*Panorp.*), *Abhand. Akad. Wissenschaf. Berlin*, 1836—1838, 106; *Burm., Handb.*, 957; M'Lach., *Journ. Linn. Soc., Zool.* ix., 256.

Body totally deep black (in the ♀ with reddish membranous lateral abdominal lines and sometimes with pale margins to the segments); the legs pale, with fuscous femora. Wings broad, whitish, with black veins; a very broad black fascia rather beyond the middle, and the apex also very broadly black, this space somewhat sinuate internally; occasionally there are two or three small black spots before the fascia. In the ♀ the spots before the

fascia are always present, and sometimes united into a narrow basal fascia, oblique in a direction contrary to that of the broad fascia, and this latter is usually furcate externally on its lower portion, forming a narrow branch, enclosing a vitreous space, or this branch is reduced to a small marginal spot. In the ♂ the posterior margin of the 3rd dorsal segment of the abdomen is produced into a short broad median lobe (usually concealing a tubercle on the surface and the 4th segment), fringed on each side with pale hairs; 6th and 7th segments stout, cylindrical, equal in length, the 7th slightly less thick than the 6th; 8th slightly longer than the 7th, cylindrical, but thinner and gradually incrassate from the base to the obliquely truncate apex, the cheliferous terminal segment short, but its claws long, piceous or reddish, the appendages that lie on its upper surface short and small, not extending to the base of the claws.*

Expanse 35—39 mm.

Probably of general distribution in Japan. I have a ♀ from North China that appears to be the same species.

P. macrogaster, M'Lach.

P. macrogaster, M'Lach., Journ. Linn. Soc., Zool. ix. 257.

Dull black, the incisures of the abdominal segments, lateral membranous lines, and wing-shoulders, reddish. Legs yellowish or reddish. Wings broad, whitish, with black veins; a broad blackish fascia beyond the middle, traversed longitudinally by a pale line between each of the veins, with a narrow external branch on the inner margin (or a short, narrow, disconnected line); apex broadly blackish, also with pale lines divided by the transverse veinlets, so that it appears fenestrate; two to four blackish basal spots before the fascia. In the ♂ the posterior margin of the 3rd dorsal segment is produced in the middle into a short broad lobe, and there is a tubercle on the surface of the 4th; 6th and 7th, much as in *P. japonica*, but the posterior angles (especially of the 7th) are more produced, forming a triangular tooth; 8th much longer

* The descriptions in the Journ. Linn. Soc. were based upon the, as I now believe, erroneous assumption that the abdomen of *Panorpa* (♂) consisted of eight segments instead of nine.

than the 7th, and very much thinner, gradually (but slightly) incrassate to the apex, which is oblique and truncate; cheliferous segment apparently as in *P. japonica*.

Expanse 34—41 mm. The only ♀ is much smaller, and has an expanse of only 30 mm.

Hakodaté; in my own collection. In some examples the pale lines in the fascia and apex are less distinct.

P. Klugi, M'Lach.

P. Klugii, M'Lach., Journ. Linn. Soc., Zool. ix. 256.

Varying from testaceous to piceous according to degree of maturity. Head and front of thorax blackish; rostrum reddish. Legs testaceous or reddish. Wings rather narrow, apex rounded; tinged with yellowish or testaceous; a narrow black fascia beyond the middle, and a broad black apical space, both with sharply defined edges, one (sometimes two) small spot before the fascia, and frequently with a small spot on the inner margin between the fascia and the apical portion (in the ♀ these spots are sometimes larger and much more distinct). In the ♂ the posterior margin of the 3rd segment is produced in the middle into a short broad lobe, and there is a tubercle on the surface of the 4th (frequently concealed by the median production of the 3rd); 6th and 7th stout, cylindrical, truncate, the posterior angles not produced, the 7th slightly thinner than the 6th; 8th longer than the 7th, cylindrical, gradually incrassate to the obliquely truncate apex; cheliferous segment larger in proportion than in the preceding species; the claws very long and slender, much curved, and crossing each other in the middle; appendages linear and slender, much curved, widely divaricate from the point where they divide into two branches from the basal piece.

Expanse 27—30 mm.

Yokohama (*Pryer*), Kobé (*Lewis*), and probably from other localities. Apparently common.

P. amurensis, M'Lach., from Amur Land, is an allied, but, as I think, certainly distinct species, differing in the basal spots on the wings being larger and more numerous, and also in structural characters, though only in degree.

P. Pryeri, sp. nov.

Deep black; the cheliferous segment testaceous, with the claws tipped with black; rostrum pale at the sides. Legs dusky testaceous, very pubescent; the tibiæ and

tarsi somewhat fuscicent. Wings more elongate, and the apex more elliptical than in the preceding species; the posterior pair more dilated in the middle; whitish, with deep black markings as follows:—in the basal portion are three narrow longitudinal lines, viz., one on the costa (broader than the others), and ending in a connected (or isolated) spot; one in the middle, oblique, and extending to the inner margin at the base of the fascia; one on the inner margin (absent in the posterior wings, but there is a spot in its place); a narrow, oblique fascia beyond the middle, and a small apical space (enclosing a pale spot), also two small curved lines on the inner margin, between the fascia and the apex; veins black. In the ♂ there is the usual broad median production of the posterior margin of the 3rd segment; 7th and 8th segments very short, the 7th deeply excised on its apical margin above, the 8th broadly conical; cheliferous segment large, as long as the 7th and 8th united; claws short; appendages apparently very broad and nearly truncate.

Expanse 35—36 mm.

One pair (♂ ♀, which do not vary) from Yokohama (*Pryer*), in Wormald's collection, and a ♀ from Hakodaté, in the British Museum. This latter has the markings of the wings rather less emphasized.

P. Wormaldi, sp. nov.

Black; the sides of the rostrum pale. Legs yellowish. Wings narrow and elongate, with elliptical apex, whitish, with blackish (not deep black) markings as follows:—the costal margin with a streak from base to apex, and a small connected spot before the first fascia; the inner margin also with a streak in which are three pale spots; beyond the middle of the wing are two very narrow fasciæ, each starting from the costal streak, and each broadly furcate in its lower half; beyond the second fascia is a simple linear fascia, and the apical dark portion is also very narrow.

Expanse 29 mm.

One ♀ from Yokohama (*Pryer*), in Wormald's collection.

P. leucoptera, Uhler.

P. leucoptera, Uhler, Proc. Ac. Nat. Sci. Philad. 1858, 31.

The following is a reproduction of the original description:—

“ ♀. Head black above, testaceous upon the antennal

region; rostrum dark testaceous, with a black line each side; palpi testaceous, with a piceous tip; antennæ dusky; eyes black, with the posterior lobe testaceous; thorax pale testaceous, a little blackish upon the prothorax; mesothorax with an irregular black superior margin, with which four spots of the same colour are connected against the origin of the wings; wings lactaceous, costal nervule black, discoidal, and most of the transverse nervules whitish, apical longitudinal nervules brown; three pale brown spots upon the subcostal areole, two of which are enclosed within it, one at the origin, the other in the middle, the third runs from the parostigmal areole to the middle of the wing; several small transverse spots are found near the posterior margin, and a large one near the apex; legs testaceous, origins of the tarsal joints and nails blackish; abdomen dull testaceous, the three basal articles and apices of the two next blackish, and appendages dusky."

"Hakodadi."

"Length to tip of abdomen $7\frac{1}{2}$ lines; alar. expanse $14\frac{1}{2}$ lines."

This species is unknown to me; my former indication that I had seen a specimen was based upon an incorrect supposition.

P. —, sp. nov.

Wings black, with white spots ("Mit ganz schwarzen, weiss gefleckten Flügeln").

Indicated by Hagen (Stett. ent. Zeit. 1867, p. 90) as received by him from the Leyden Museum. It is not in the collection forwarded to me from Leyden, and is quite unknown to me.

LEPTOPANORPA, gen. nov.

Differs from *Panorpa* by the extreme slenderness of all its parts; the wings very narrow; the rostrum exceedingly long; the three terminal segments of the ♂ abdomen immensely long, and almost thread-like, the cheliferous segment being provided with a very long footstalk; the basal (unmodified) segments long (not transverse as in *Panorpa*).

L. Ritsemæ, sp. nov.

Testaceous, the head blackish (excepting posteriorly), and with a black median line along the thorax (in the ♀

the head and thorax are nearly wholly blackish above). Legs yellowish; wings with a slight testaceous tinge, and with fuscous veins; there is a very narrow pale fuscous fascia beyond the middle, expanding on the costa, where it forms the inner side of the pterostigma (in the posterior wings this fascia is abbreviated or interrupted), and (in the ♀) two or three small basal spots; posterior edge of the 5th abdominal segment in the ♂ blackish; terminal segments yellowish; 6th and 7th segments each nearly as long as all the basal segments united; the apical portion gradually incrassate; footstalk of the cheliferous segment scarcely shorter and of the same form; its apex considerably dilated, so that the basal portion (before the claws) is somewhat pyriform; claws long, strongly curved and crossing; appendages very long and slender, extending beyond the base of the claws. (In the ♀ the terminal segments of the abdomen are very slender.)

Total length of body of ♂ about 25 mm.; expanse 25 mm.

One pair (♂, ♀) in the Leyden Museum; captured by Von Siebold.

L. Sieboldi, sp. nov.

Head deep black, pale posteriorly; rostrum piceous, with pale sides. Thorax piceous in front, testaceous posteriorly, wholly yellow beneath. Abdomen fuscous. Legs yellow. Wings with a slight greyish tinge, and with fuscous veins; the only marking is a rather broad pale fuliginous apical space, straight internally (♀).

Expanse 24 mm.

Two females in the Leyden Museum; captured by Von Siebold.

An approach towards the abdominal formation in the ♂ of *Leptopanorpa* is to be found in *P. nematogaster*, M'Lach., from Java (perhaps also in *P. Charpentieri*, Burm.), but in it the cheliferous terminal segment is sessile. The genus very clearly shows that the abdomen in the *Panorpidæ* has nine segments; for the 1st segment, ordinarily confused with the hinder portion of the meta-thorax, is here very long.

PANORPODES, gen. nov.

General form much as in *Panorpa*. In the ♂ the abdomen is short; all the segments (excepting the terminal

one) are narrow and transverse, the 8th especially so, and not modified; the cheliferous segment ordinary, sessile, the claws short and stout. In the anterior wings the sub-costa extends into the pterostigmatal space, in the posterior it is abbreviated; the wings without dark markings. The rostrum very short, triangular; maxillary palpi having the 3rd and 4th joints very much dilated, and concave within, 2nd and 5th thin, 1st very short, the others longer and subequal; maxillary lobes narrow, but the inner broader than the outer, and furnished with a crest of cilia at the tip; labial palpi with the joints short and not dilated, but the 2nd slightly clavate; labrum (rostrum) with a deep triangular notch at the apex. Tarsal claws simple (not serrate), strongly curved.

This genus is, in many respects, intermediate between *Panorpa* and *Euphania* (Westw.). By its very short rostrum and narrow and unmodified penultimate and antepenultimate male segments it approaches the latter, while in the form of the wings and in the composition of the cheliferous segment it is more allied to *Panorpa*. In *Euphania* the costal area of the wings is broadly dilated and the cheliferous segment bears only modified claws, the whole segment being considerably different in structure from that of *Panorpa*. As heretofore, I am inclined to consider *Euphania* identical with *Chorista* (Klug), though Klug neither describes nor figures the dilated costal area. If *C. australis* be not *E. luteola*, then it is some insect that has not since been observed: and I must admit that the details of the mouth-parts of *C. australis*, as given by Klug, do not agree with those of *E. luteola*, in which the maxillary palpi have the 3rd and 4th joints very much dilated, as in *Panorpodes*; but in *E. ruficeps* (Newm.) these palpi are formed much in the manner as indicated for *Chorista*, still, however, with the characteristic dilatation of the costal area in the wings.

P. paradoxa, sp. nov.

Testaceous. Head shining-black between the ocelli; antennæ fuscous, excepting at the base. Legs testaceous. Wings wholly pale yellowish, shining, without markings, only that the pterostigmatic region is more opaque and finely granulose; veins pale fuscous, the transverse veinlets nearly transparent and almost colourless.

Claws of the terminal segment (of ♂) reddish at the tips, and with a tuft of pale hairs internally near the base; appendages laterally very broad, concave internally, crossing at the tips, where there is a minute black second joint (♂).

Length of body 9 mm.; expanse 31 mm.

Two males from Yokohama (*Pryer*), in Wormald's collection.